

Figure 1-6k

- On the same screen, plot $f_1(x) = f(x)$ and $f_2(x) = f(-x)$. Use thick style for $f_2(x)$. Based on the properties of negative numbers raised to even powers, explain why the two graphs are identical.
- Deactivate $f_1(x)$ and $f_2(x)$. On the same screen, plot $f_3(x) = g(x)$, $f_4(x) = g(-x)$, and $f_5(x) = -g(x)$. Use thick style for $f_5(x)$. Based on the properties of negative numbers raised to odd powers, explain why the graphs of $f_4(x)$ and $f_5(x)$ are identical.
- Even functions have the property $f(-x) = f(x)$. Odd functions have the property $f(-x) = -f(x)$. Figure 1-6l shows two functions, h and j , but you don't know the equation of either function. Tell which function is an even function and which is an odd function.

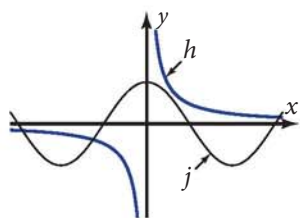


Figure 1-6l

- Let $e(x) = 2^x$. Sketch the graph. Based on the graph, is function e an odd function, an even function, or neither? Confirm your answer algebraically by finding $e(-x)$.
10. **Absolute Value Function—Odd or Even?** Plot the graph of $f(x) = |x|$. Sketch the result. Based on the graph, is function f an odd function, an even function, or neither? Confirm your answer algebraically by finding $f(-x)$.

11. **Step Discontinuity Problem:** Figure 1-6m shows the graph of

$$f(x) = \frac{|x|}{x}$$

The graph has a *step discontinuity* at $x = 0$, where $f(x)$ jumps instantaneously from -1 to 1 .

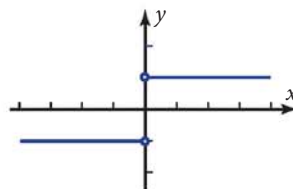


Figure 1-6m

- Plot the graph of $f_1(x) = f(x)$. Use a window that includes $x = 0$ as a grid point. Does your graph agree with the figure?
- Figure 1-6n is a vertical dilation of function f with vertical and horizontal translations. Enter an equation for this function as $f_2(x)$, using operations on the variable $f_1(x)$. Use a window that includes $x = 4$ as a grid point. When you have duplicated the graph in Figure 1-6n, write an equation for the transformed function in terms of function f .

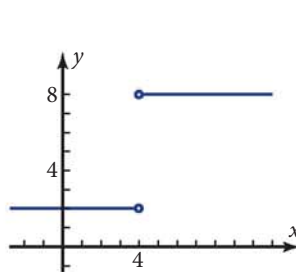


Figure 1-6n

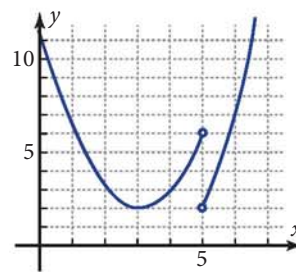


Figure 1-6o

- Figure 1-6o shows the graph of the quadratic function $y = (x - 3)^2$ to which something has been added or subtracted to give it a step discontinuity of 4 units at $x = 5$. Find an equation of the function. Verify that your equation is correct by plotting it on your grapher.